

In re application: Murry *et al.*

Filed: May 15, 2001

Amendment with RCE dated 06/19/2003

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Serial No.: 09/855,853

Attorney' Docket: PAT013US

Reply to Final Office action of 04/22/2003

REMARKS/ARGUMENTS

Claims 48-71 are pending in this application. Claims 48-72 have been rejected. The independent claims 48 and 62 and various dependent claims have been amended, and claim 72 has been canceled, to more particularly point out and distinctly claim the subject matter of the present invention. Applicant hereby requests further examination and reconsideration of the application in view of the foregoing amendments and these remarks.

Applicant's undersigned attorney Kinsella would like to thank Examiner Rodriguez for his courtesy in a telephone conference with the undersigned on June 11, 2003. The Examiner clarified that claim 48 should have been referred to instead of claim 42 in the Office Action, so that the pending claims were 48-72 not 48-72, and similar for ranges of claims referred to elsewhere in the Office Action.

On page 2 of the final Office Action, the Examiner advised that if claim 63 is found allowable then claim 72 would be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. Claim 72 has been canceled. Applicant therefore submits that this objection is moot.

The Examiner rejected independent claims 48 and 62, and dependent claims 49-53, 58, 59, 61, 54, 65, 70, and 71 under §102(e) based on Tabuchi (PN 6,112,002). The remaining dependent claims were rejected under §103(a) based on Tabuchi in view of Ota et al.

Applicant has amended independent claims 48 and 62 to clarify that the at least one surface-emitting laser mounted on the mounting surface of the optical bench substrate is a *surface-emitting laser*. The at least one surface-emitting laser is mounted *on its edge* on the mounting surface so that its output laser beam is emitted parallel to the mounting surface. In particular, the independent claims have been amended to provide that the at least one surface-emitting laser has a primary epi surface from which laser radiation is emitted *in a direction perpendicular to the primary epi surface*, a mounting edge perpendicular to the primary epi surface, *and an active region parallel to the primary epi surface and perpendicular to the direction in which the laser radiation is emitted*, the at least one surface-emitting laser being mounted at its mounting edge on the mounting surface.

This is as opposed to an *edge-emitting laser* mounted on a substrate. In an edge-emitting laser, radiation is emitted parallel to the active (gain) region layer, through an edge that is

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perpendicular to the active region. In a surface-emitting laser, light is emitted parallel to the direction of epi-growth, i.e. perpendicular to the active region and the surface through which it exits. See Specification, page 2, lines 2-5; page 8, lines 15-19, 26-27; and Fig. 3, showing the active region layer 14 is perpendicular to the direction of emitted radiation.

Tabuchi shows only "semiconductor laser" array 200. Fig. 28A, col. There is no suggestion that laser 200 is a surface emitting laser. In fact, it is clear from the teaching of Tabuchi that semiconductor laser 200 is an array of edge-emitting lasers. See, e.g., Fig. 3, showing active layer 201 of laser 200, which is coupled to the optical fiber 3A: "optical fiber 3A is placed so that the tip is optically coupled to a light emitting active layer 201" (col. 2, lines 8-11). See also Figs. 1, 11B, 12A; col. 5, line 66 to col. 6, line 1; and col. 6, line 64 to col. 7, line 4, stating that "Still another object of the present invention is to solve another problem that when the *axis alignment* between the semiconductor laser and the optical waveguide is performed, the axis alignment is very hard to be performed in high precision, because the height of the *active layer of the semiconductor laser is different from the height of the core of the optical waveguide, each as measured from the substrate*" (emphasis added), clearly referring to an edge-emitting laser in which the core of the fiber is placed next to the active layer, which is the standard edge-emitting laser/fiber coupling. The lasers of semiconductor laser array 200 are clearly edge-emitting lasers containing active regions *parallel* to the surface of the substrate they are mounted on and parallel to the direction of emitted radiation coupled into the fibers.

Applicant submits that it is exceedingly clear that the semiconductor laser arrays referred to and described in Tabuchi are *edge-emitting lasers*, in which their active region is parallel to the surface of the substrate they are mounted on and parallel to the direction of emitted radiation. There is no teaching or suggestion whatsoever to place *surface-emitting lasers* on their edge on a mounting surface of a substrate. In particular, there is no teaching or suggestion in Tabuchi that lasers 200 have *an active region perpendicular to the direction in which the laser radiation is emitted*. In fact, Tabuchi's lasers 200 are edge-emitting and have an active region parallel, *not* perpendicular, to the emitted radiation and the mounting surface.

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For these reasons, Applicant submits that independent claims 48 and 62, as amended, are neither anticipated nor obvious in view of Tabuchi, and that independent claims 48 and 62, and their variously-dependent claims, are in condition for allowance.

The Assistant Commissioner for Patents is hereby authorized to charge any additional fees or credit any excess payment which may be associated with this communication to our deposit account 50-1705.

In view of the foregoing remarks and amendments, claims 48-71, as variously amended, are believed to be in condition for allowance. Allowance of the pending claims at an early date is earnestly solicited.

The undersigned may be contacted for any questions.

Respectfully submitted,

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